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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/608,964	06/30/2000	Kiwamu Takehisa	VX002160	1572

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EXAMINER

DIAZ, JOSE R

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 09/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/608,964

Applicant(s)

TAKEHISA ET AL.

Examiner

José R Díaz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 8-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 10, 2003 has been entered.

Claim Objections

Claim 12 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Please correct the dependency of claim 12.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

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only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 8 and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Basting et al. (US Pat. No. 6,154,470).

Regarding claim 8, Basting et al. teaches a fluorine laser (see abstract) comprising a laser chamber (2) which is filled with a laser gas including fluorine (F₂) (see figs. 2a, 2b, 8a, 8b, 9a, and 9b) and to which a predetermined discharge voltage is applied between a cathode and an anode (3a, 3b) thereof for causing a fluorine laser to oscillate laser light (LASER OUTPUT BEAM) to be supplied as an exposure light source of an exposure apparatus (see figs. 2a, 2b, 8a, 8b, 9a, and 9b), wherein total pressure of said laser gas is set equal to or lower than 2.8 atm (see col. 2, lines 30-34 and col. 8, lines 54-57) such that a bandwidth (linewidth) of laser light oscillated by said laser chamber is narrowed to a desired value (see col. 6, lines 8-10).

Regarding claim 11, Basting et al. teaches that the interval between the cathode and anode (3a, 3b) is set at a predetermined length to maintain glow discharge without causing dielectric breakdown between said cathode and anode when total pressure of said laser gas is set equal to or lower than 2.8 atm (see col. 3, lines 48-50 and col. 4, lines 28-24).

Claims 8 and 9 are rejected under 35 U.S.C. 102(e) as being anticipated by Szatmári (US Pat. No. 5,303,254).

Regarding claim 8, Szatmári teaches a fluorine laser (see col. 6, lines 37-39) comprising a laser chamber (see Figs. 2 and 5) which is filled with a laser gas including

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fluorine (see col. 6, lines 37-39) and to which a predetermined discharge voltage is applied between a cathode and an anode ("two elongated electrodes") thereof for causing a fluorine laser to oscillate laser light (see col. 6, lines 27-27 and 41-47) to be supplied as an exposure light source of an exposure apparatus (see fig. 2), wherein total pressure of said laser gas is set equal to or lower than 2.8 atm ("total pressure of 2.6 bar") (see col. 8, lines 46-47) such that a bandwidth of laser light oscillated by said laser chamber is narrowed to a desired value (see col. 6, lines 8-10).

Regarding claim 9, Basting et al., as stated before, teaches a fluorine laser as recited in claim 8. In addition, Basting et al. further teaches the limitation that the bandwidth of laser light oscillated by said laser chamber is narrowed to a desired value (see col. 6, lines 8-10) without use of an optical element to further narrowing said bandwidth of laser light (see col. 10, lines 36-53, wherein Basting et al. discloses that the use of etalon in the apparatus is optional and can be replaced with highly reflective mirror).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

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the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 8-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nozue et al. (US Pat. No. 4,856,018) in view of Wakabayashi et al. (US Pat. No. 5,642,374).

Regarding claim 8, Nozue et al. teaches a well known excimer laser (see Fig. 11) comprising a laser chamber (10) which is filled with a laser gas including fluorine (see col. 1, lines 15 and 19-21 and col. 2, lines 12-16) and to which a predetermined discharge voltage is applied between a cathode and an anode (16) thereof for causing a fluorine laser to oscillate laser light (see col. 1, lines 15 and 19-21 and col. 2, lines 12-16) to be supplied as an exposure light source of an exposure apparatus (see fig. 11). However, Nozue et al. fails to teach the limitation of controlling the total pressure of said laser gas to about 2.8 atm or lower such that a bandwidth of laser light oscillated by said laser chamber is narrowed to a desired value. Wakabayashi et al. teaches that it is well known in the art to include a gas control means for controlling composition or total pressure of the prescribed types of laser gases in such a way that the beam profile is shaped as desired (see col. 3, lines 30-35). Nozue et al. and Wakabayashi et al. are analogous art because they are from field of endeavor as applicant's invention. At the

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time of the invention it would have been obvious to a person of ordinary skill in the art to include a gas control means for controlling composition or total pressure of the prescribed types of laser gases in such a way that the beam profile is shaped as desired. The motivation for doing so, as is taught by Wakabayashi et al., is controlling the beam profile to the desired shape by adjusting the gas amount (col. 3, lines 35-40). Therefore, it would have been obvious to combine Nozue et al. with Wakabayashi et al. to obtain the invention of claim 8.

With regards to the specific pressure range claimed by applicant, Wakabayashi et al. provides the general teaching of controlling the total pressure of the laser gases in such a way that the beam profile is shaped as desired. It would have been obvious to one of ordinary skill in the art to control the total pressure of the laser gas to about 2.8 atm or lower, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. *In re Huang*, 40 USPQ2d 1685,1688(Fed. Cir. 1996) citing *In re Aller*, 105 USPQ 233., 235 (CCPA 1955).

Regarding claim 9, Nozue et al. and Wakabayashi et al., as stated before, teaches the claimed fluorine laser (see rejection of claim 8, above). In addition, Nozue et al. further teaches the limitation that the bandwidth of laser light oscillated by said laser chamber (10) is narrowed to a desired value without use of an optical element to further narrowing said bandwidth of laser light (see fig. 11, wherein the output beam of the laser chamber (10) is directed to the amplifier 20 by the mirrors 17 and 18).

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Regarding claim 10, Nozue et al. fails to teach the limitation of controlling the total pressure of said laser gas to about 1 atm or lower such that a bandwidth of laser light oscillated by said laser chamber is narrowed to a desired value. Wakabayashi et al. teaches that it is well known in the art to include a gas control means for controlling composition or total pressure of the prescribed types of laser gases in such a way that the beam profile is shaped as desired (see col. 3, lines 30-35). Nozue et al. and Wakabayashi et al. are analogous art because they are from field of endeavor as applicant's invention. At the time of the invention it would have been obvious to a person of ordinary skill in the art to include a gas control means for controlling composition or total pressure of the prescribed types of laser gases in such a way that the beam profile is shaped as desired. The motivation for doing so, as is taught by Wakabayashi et al., is controlling the beam profile to the desired shape by adjusting the gas amount (col. 3, lines 35-40). Therefore, it would have been obvious to combine Nozue et al. with Wakabayashi et al. to obtain the invention of claim 10.

With regards to the specific pressure and bandwidth ranges claimed by applicant, Wakabayashi et al. provides the general teaching of controlling the total pressure of the laser gases in such a way that the beam profile is shaped as desired. It would have been obvious to one of ordinary skill in the art to control the total pressure of the laser gas to about 1 atm or lower such that the beam profile is shaped as desired (e.g. a beam having a bandwidth not exceeding 0.6 pm), since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or

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working ranges involves only routine skill in the art. *In re Huang*, 40 USPQ2d 1685,1688(Fed. Cir. 1996) citing *In re Aller*, 105 USPQ 233., 235 (CCPA 1955).

Regarding claim 11, Nozue et al. teaches that the interval between the cathode and anode (16) is set at a predetermined length to maintain glow discharge (see Fig. 11). With regards to the total gas pressure, please see the rejection of claim 8 above.

Regarding claim 12, Nozue et al. teaches that the discharge mode for causing said glow discharge (see area between electrodes 16) is longitudinal discharge (please note that in a 2D view the glow or plasma discharge is defined by two axis: longitudinal axis (x) and the transverse or vertical axis (y)) in which discharge occurs in the same direction as an optical axis of laser light oscillated in said laser chamber (10) (see fig. 11).

Regarding claim 13, Nozue et al. teaches that the laser apparatus further comprises an oscillator (10) and an amplifier (20) (see Fig. 11).

Regarding claim 14, Nozue et al. teaches that the discharge mode for causing said glow discharge (see area between electrodes 16) is transverse discharge in which discharge occurs in a direction perpendicular to an optical axis of laser light oscillated in said laser chamber (10) (see fig. 11).

Response to Arguments

Applicant's arguments with respect to claims 8-14 have been considered but are moot in view of the new ground(s) of rejection.

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Conclusion


The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following references teach transverse-longitudinal discharge excitation: Rothe (US Pat. No. 4,240,043), Yoshioka et al. (US Pat. No. 5,005,181), Tanuma (US Pat. No. 4,958,356), Komori et al. (US Pat. No. 6,151,350), and Kajiyama et al. (US Pat. No. 4,829,536).

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to José R Díaz whose telephone number is (703) 308-6078. The examiner can normally be reached on 9:00-5:00 Monday, Tuesday, Thursday and Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703) 308-1690. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.


GEORGE ECKERT
PRIMARY EXAMINER

JRD